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(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
7 August 2003 (07.08.2003)

PCT

(10) International Publication Number
WO 03/064771 A1

(51) International Patent Classification[7]: E01F 9/04, 9/08, E01C 23/16

(21) International Application Number: PCT/US03/03156

(22) International Filing Date: 3 February 2003 (03.02.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/061,420 1 February 2002 (01.02.2002) US

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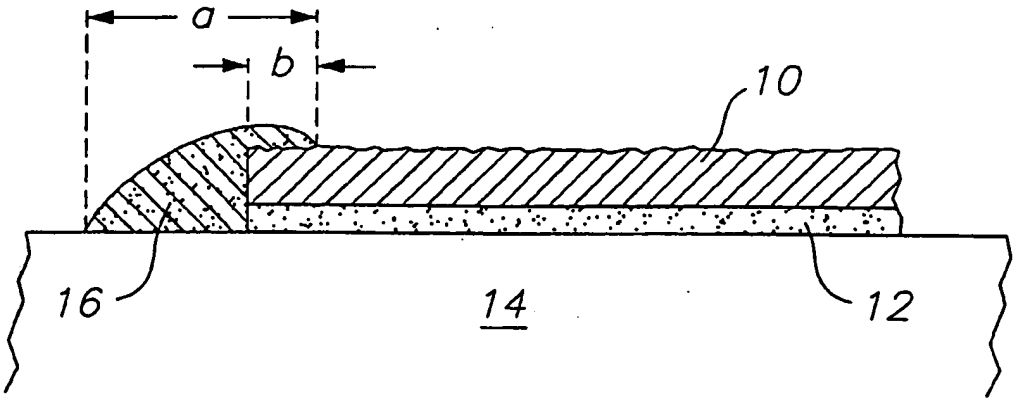
(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*
— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD FOR SECURING PREFORMED PAVEMENT MARKING CONSTRUCTIONS



(57) Abstract: A method for securing a pavement marking construction to the pavement includes sealing the perimeter edge of the pavement marking construction by applying a structural adhesive around the perimeter edge of the pavement marking construction. The seal is applied so that it overlaps the top surface of the pavement marking construction at the perimeter edge and extends to the pavement surface. The sealed pavement marking construction will be more durable and will resist peeling from the pavement, even when subjected to heavy traffic.

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METHOD FOR SECURING PREFORMED PAVEMENT MARKING CONSTRUCTIONS

FIELD OF THE INVENTION

The present invention is directed to a method for improving the adherence between a preformed pavement marking construction and the pavement, and improving the durability of the pavement marking construction.

BACKGROUND OF THE INVENTION

Pavement marking constructions are used extensively to visually delineate various information on paved areas such as roadways and parking areas. Roadways are commonly marked with lines to identify the edges or center of a road, or to distinguish the various lanes of a roadway. Similarly, roadways are often marked with lines to identify crosswalks at intersections or parking spaces on the side of a road. Sometimes roadways can include textual messages with traffic instructions such as the word "STOP." Roadways can also include symbols such as arrows which are useful for emphasizing traffic patterns, or a symbol with a graphical representation such as a bicycle for identifying bicycle lanes.

The paved portions of parking structures such as parking lots similarly use various markings to provide useful information to motorists such as roadway markings, crosswalks, parking spaces and textual messages with simple traffic instructions. In addition to textual and graphical traffic instructions such as the word "STOP" or arrows similar to those used on roadways, parking structures often include other simple textual information such as "ENTER," "EXIT," or "DRIVE-THRU." It is also common for parking structures to use symbols to identify those parking places reserved for handicapped persons. Moreover, some establishments choose to decorate the pavement of a parking lot with graphical information such as a corporate logo.

Traditionally, pavement markings are either applied to a pavement surface as a liquid such as a paint, or as a preformed sheet or strip. Liquids such as paints can be provided in many forms including water- and solvent-based paints or two-part epoxy paints. The application of pavement markings using paint generally requires special skill on the part of the painter and sometimes expensive painting equipment. The often lengthy drying times associated with liquid pavement markings can also result in increased manpower costs and can be an inconvenience to motorists due to road closures to accommodate pavement marking operations. Furthermore, it is often desired for the pavement marking to be skid-resistant or reflective and for such applications skid-resistant particles and retroreflective elements must either be mixed into the paint, or applied to the surface of the wet paint after the paint has been applied. Either method requires additional steps, lengthening the application time. Furthermore, where mixing of a solvent-based or epoxy paint or liquid is required, still further skills are required of the worker or workers who mix such a paint or

liquid as the quality of the finished product depends heavily on whether or not the ingredients have been mixed in the proper proportions.

More recently, preformed strips or sheets of pavement marking constructions have been used for pavement marking. Such preformed strips and sheets are generally about 2 to 3 millimeters thick. One benefit of such preformed materials is that retroreflective elements and skid-resistant particles can be added to the preformed sheets or strips during manufacture, simplifying their application. Another benefit is that, unlike a liquid-based marking material, little if any drying or curing time is required once they are applied. This permits traffic flow to be resumed more quickly than for marking materials requiring lengthy drying or curing time.

Preformed sheets and strips of pavement marking are generally one of two types. The first is a type in which the preformed strip or sheet is first placed in the desired location on the pavement and then is heated in order to melt and adhere it to the pavement surface. The second type generally uses a pressure sensitive adhesive to affix the pavement marking construction to the pavement. For ease of reference in this specification, the first type of preformed pavement marking construction will be referred to as a "hot stick" construction and the second type will be referred to as a "cold stick" construction.

For a hot stick type of pavement marking construction, one common way of heating such a strip or sheet is by using a propane torch. While hot stick constructions offer certain benefits over liquid-based marking materials, the application of a hot-stick pavement marking strip or sheet with a torch can be quite time consuming in that both the entire surface of the sheet or strip and the road surface must be heated to temperatures as specified by the manufacturer to ensure good bonding to the pavement surface. Furthermore, its application also requires some degree of skill on the part of the person applying it in order to assure that the entire strip or sheet is adequately bonded to the pavement surface without applying so much heat that the surface of the preformed strip or sheet is burned or scorched. Excess heat can also cause the retroreflective elements to embed too deep into the hot stick markings causing inadequate retroreflectivity. Moreover, the use of compressed cylinders of flammable gas such as propane is generally inconvenient due to both the special equipment required to safely contain and use such gases as well as the special safety precautions required in handling containers of compressed flammable gases.

The cold stick types of pavement marking constructions are generally quite simple to install. Typically, the adhesive is already on the underside of the pavement marking construction, protected by a release liner. To apply, the release liner is peeled from the adhesive and the construction is pressed directly to a clean pavement surface. If necessary, it is rolled down after application to ensure a good bond to the pavement. In practice, another common technique for rolling down a cold stick pavement marking construction is by driving a car or truck over the construction. However, while cold stick pavement marking materials

are generally quite simple to apply, they have not generally proven to be as durable as is desirable.

Durability problems common to most prior art pavement marking strips and sheets are that such strips and sheets often separate from the pavement surface when exposed to the rigors of vehicle traffic. The forces that cause such separation include the impact forces imparted by a vehicle's tires as each tire strikes the edge of the marking material. Shear forces are also imparted by a tire as it passes along the top surface of the marking material, especially if the vehicle is braking or accelerating, and especially if the traffic patterns are perpendicular to any seams or edges of the pavement marking strip or sheet.

In addition to being required to withstand the forces imparted by vehicular traffic, pavement marking constructions of all types are typically exposed to elements of nature including rain and snow, as well as extremes in temperature. Still further, pavement marking materials are subjected to the oil and dirt common to pavement surfaces. These environmental conditions together tend to cause premature failure, and in particular, peeling of the pavement marking construction from the pavement surface. In cold climates where snow is common, pavement marking strips may also be subject to the forces imparted by the blade of a snowplow which can tend to lift the strip from the pavement.

SUMMARY OF THE INVENTION

According to the invention, a method is set forth for securing a pavement marking construction to a pavement surface. First, the pavement marking construction is applied to the pavement surface using conventional methods. Then an edge seal is provided around the perimeter of the pavement marking construction. The edge seal is made from any one of a number of different structural adhesives such as a curable epoxy. The edge seal is applied to at least one perimeter edge of the pavement marking construction such that the structural adhesive overlaps a portion of the pavement surface and a portion of the top surface of the pavement marking construction at its perimeter edge. In the preferred embodiment, the entire perimeter of the pavement marking construction is sealed. Once the edge seal is cured, it will help to prevent any lifting or curling of the edge of the pavement marking construction. Such an edge seal is also effective at helping to deflect the impacts caused by vehicle traffic. The result is that by applying an edge seal in accordance with the present invention, a conventional pavement marking construction can be made far more durable.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a cross-sectional side view of a sealed pavement marking construction of the present invention; and

FIG. 2 is a side view of the removable blade assembly of the impact tester.

DETAILED DESCRIPTION OF THE INVENTION

An improved method for adhering a pavement marking construction according to the present invention is illustrated in the embodiment of FIG. 1. For this embodiment, a preformed thermoplastic marking construction 10 is adhered by adhesive 12 to a road surface 14 as is well known. According to the invention, the adherence and durability of the construction are improved by providing an edge seal 16 around the perimeter of the construction.

Preferred sealing materials are structural adhesives such as one-part and two-part epoxies, multi-component polyurethanes, silicone adhesives and UV curable adhesives and resins. One example of a two-part epoxy is Devcon high strength 2-Ton Epoxy sold by Devcon of Danvers, Massachusetts. Another example of a two-part epoxy is Loctite Extra Time Epoxy sold by Loctite Corp. of Rocky Hill, Connecticut. This particular Loctite product sets in 90 minutes which provides adequate time for mixing and applying the adhesive while offering a relatively fast cure time. The adhesives used in the present invention can be clear, or can include pigment.

For those applications in which the pavement marking construction will be subjected to traffic flow that is predominantly from a single direction, the seal should be applied to at least the leading edge of the pavement marking construction, that is, the edge toward the direction of traffic flow. For those pavement marking constructions that will be subjected to traffic from various directions, or where still improved adhesion and durability characteristics are desired, the entire perimeter of the pavement marking construction can be sealed. As shown in the drawing figure, the seal overlaps over a portion of the top of the pavement marking construction to ensure good bonding, to prevent edge lifting, and to improve the durability of the construction. In the drawing, the width of the seal is designated by the letter *a* while the width of the portion of the seal overlapping the top surface of the marker is designated by the letter *b*. Preferably, *a* is between about 0.2 inch (5 mm) and 0.8 inch (20 mm), and most preferably, at least about 0.3 inch (7.5 mm). Preferably, *b* is between about 0.1 inch (3 mm) and 0.3 inch (7.5 mm), and most preferably, at least about 0.2 inch (5 mm). According to another embodiment, the entire surface of the pavement marking construction may be sealed.

While the invention is generally described for use with preformed pavement marking constructions, whether of the hot stick or cold stick type, the invention can be used with all types of pavement marking constructions including pavement marking constructions applied in liquid form such as epoxy and painted constructions.

In order to test the durability of the constructions adhered to surfaces using the present invention, an impact tester was built similar to the vehicle wear simulator described in U.S. Patent No. 5,453,320. The device includes two tires, each mounted on a rim. The tires used were 8-ply caster tires made by Titan and measuring 18 inches (457 mm) in diameter with a

tread width of 5 11/16 inches (144 mm). The tread of the tire exhibited a Shore A Hardness of between 63 and 67. The tires were inflated to a pressure of 90 psi (6.2 bar). Each rim was mounted to an axle which in turn was mounted to a fork. The two forks were positioned at a distance from one another on a rigid horizontal frame, the forks holding the tires and rims in a vertical position parallel to one another and separated by 0.9 meters. In operation, the horizontal frame is rotated in a horizontal plane about its center point using a vertically mounted, variable-speed electric motor. The motor causes the horizontal frame to rotate such that the tires are driven in a circular path over a concrete test surface.

The concrete test surface was made of a plurality of concrete bricks arranged adjacent one another in a grid on a rigid base to form a continuous horizontal surface. Each concrete brick was about 3.85 inches (98 mm) wide by 7.75 inches (197 mm) long and 2.55 inches (65 mm) thick. Individual bricks were shimmed as necessary using aluminum shims placed between the bottom of the brick and the rigid base to account for any minor variations in brick thickness, thereby providing a relatively even horizontal test surface. An outer frame held the plurality of bricks in place to prevent them from slipping with respect to the rigid base during the testing operation.

The horizontal frame also included brackets to hold a plurality of weights. During testing, weights were placed evenly about the horizontal frame's axis of rotation to provide an even downward tire force to the concrete test surface in order to simulate traffic flow across a pavement surface. The entire test apparatus was placed within an environmental chamber which permitted adjustment of both temperature and humidity within the chamber to simulate different pavement conditions.

In order to simulate the forces generated on a pavement marking construction caused by snowplow operation, the impact tester was also fitted with a removable blade assembly as set forth somewhat schematically in FIG. 2. The blade assembly included a mounting arm 22 extending vertically from the horizontal frame of the impact tester toward the concrete test surface ahead of one of the wheels. A pivot arm 24 was pivotally attached to the mounting arm at pivot point 26. A 6.0 inch (15 cm) wide and 0.25 inch (0.64 cm) thick 1075 high carbon steel blade 28 was fastened to the pivot arm with the leading edge of the blade directly below the pivot point at a distance *R* of 1.2 feet (0.36 meters) from the pivot point and with the blade arranged perpendicular to the direction of travel. The blade was maintained in tension by a spring 32 mounted between the mounting arm and the pivot arm in a generally horizontal plane approximately midway between the pivot point and the leading edge of the blade such that the blade was drawn toward the direction of travel during testing. For this impact tester, the spring had a spring coefficient of 57 pounds per inch (10,000 N/m). A stop arm 34 was mounted at the lower end of the mounting arm. With the spring in tension, the pivot arm abutted the stop arm such that the blade was held at a position about 60° from horizontal with the leading edge of the blade directly below the pivot point. The blade

included a beveled cutting edge with about a 60° bevel such that the beveled edge of the blade was generally horizontal to the concrete test surface. By this arrangement, when the moving blade came into contact with an obstacle, the pivot arm pivoted the blade in the reverse direction, up and away from the concrete test surface, while maintaining some downward pressure on the obstacle. The mounting arm of the blade assembly was vertically adjustable to allow adjustment of the height of the blade above the concrete test surface. For tests conducted using the blade assembly, the height of the blade was adjusted to be adjacent the top of the concrete test surface.

EXAMPLE 1

Two identical samples were cut from a 60 mil (1.5 mm) thick sheet of HotTape brand preformed pavement marking construction material to sample sizes measuring 3 inches (76 mm) by 6 inches (150 mm). HotTape is produced by the Highway Safety Division of assignee. The samples were individually adhered to concrete bricks which had been brushed clean. Rather than using heat to apply the samples, an adhesive transfer tape known as UHA 8791 which is produced by the Specialty Tapes Division of assignee was used. The adhesive was provided on the transfer tape at a coatweight of 210 grams per square meter. Each construction was then pressed to the surface of a test brick and held in place using foot pressure applied for at least one minute. The samples were allowed to set for at least ten minutes before testing.

The first sample was designated Sample A and used as a control sample. The second sample was designated Sample B, and for this sample a seal was applied to the outer perimeter of the construction. The seal for Sample B was formed by applying a two-part epoxy around the perimeter of the pavement marking constructions. The particular two-part used was Devcon 2-Ton Epoxy which is sold by Devcon of Danvers, Massachusetts. Equal parts of epoxy and hardener were mixed according to the manufacturer's instructions and applied in a bead around the perimeter of the construction between the edge of the construction and the test brick to which it was adhered. The bead was about 3/8 inch (10 mm) wide with about 1/8 inch (3 mm) overlapping the top surface of the construction. The sealed construction was allowed to cure and the concrete bricks to which Samples A and B were adhered were then placed on the rigid base within the outer frame and in the path of the tires of the impact tester described above. Weights were added to the horizontal frame of the impact tester to bring the total weight on the tires to 825 pounds. The environmental chamber was then adjusted to 40°C and 80% relative humidity. Once equilibrium had been reached within the chamber, the motor was started and adjusted to 60 RPM. During the run, the individual samples were observed for failure. Failure was defined as the separation, wearing, or edge lifting of ¼ inch (6 mm) portion of the sample or the shearing of the sample by a ¼ inch from its original location on the concrete brick at the leading or trailing edge of

the sample, that is, the edges impacted by the tires' path. According to this test, Sample A failed at 22 minutes while Sample B did not fail until 60 minutes.

EXAMPLE 2

Two identical samples were cut from a 60 mil (1.5 mm) thick sheet of HotTape brand preformed pavement marking construction material to sample sizes measuring 3 inches (76 mm) by 6 inches (150 mm) as set forth above. The samples were individually adhered to concrete bricks which had been brushed clean. The adhesive used was a transfer tape known as UHA 1191 which is a crosslinked rubber-based adhesive produced by the Specialty Tapes Division of assignee. The particular adhesive used was of the type set forth in U.S. Patent No. 4,820,746. The adhesive was provided at a coatweight of 275 grams per square meter. Each construction was then pressed to the surface of a test brick and held in place using foot pressure applied for at least one minute. The samples were allowed to set for at least ten minutes before testing.

The first sample was designated Sample C and used as a control sample. The second sample was designated Sample D, and for this sample a seal was applied to the outer perimeter of the construction. The seal for Sample D was formed by applying Devcon 2-Ton Epoxy as described above for Example 1. The sealed construction was allowed to cure and the concrete bricks to which Samples C and D were adhered were then placed on the rigid base within the outer frame and in the path of the tires of the impact tester described above. Weights were added to the horizontal frame of the impact tester to bring the total weight on the tires to 800 pounds. The blade assembly was attached to the impact tester and its height was set flush to the concrete surface of the test bricks to simulate snowplow operation. The environmental chamber was then adjusted to -15°C and 20% relative humidity. Once equilibrium had been reached within the environmental chamber, the motor was started and adjusted to 60 RPM. During the run, the individual samples were observed for failure. Failure was defined as set forth in Example 1. According to this test, Sample C failed at 3 minutes while Sample F did not fail after more than 210 minutes.

As shown by the results of Examples 1, and 2, a pavement marking construction which includes an edge seal according to the present invention shows generally improved strength and durability over a comparable construction without an edge seal.

EXAMPLE 3

Two identical samples were cut from sheet of Stamark brand Series 380 preformed, cold stick, self-adhesive pavement marking tape to sample sizes measuring 3 inches (76.2 mm) by 6 inches (150 mm). Each sample had a thickness of about 65 mil (1.7 mm) at the thickest portion. The Stamark products are produced by the Minnesota Mining and Manufacturing Company of St. Paul, Minnesota. Each of the two constructions was applied

to the surface of a test brick which had been brushed clean, and each construction was held in place using foot pressure applied for at least one minute. These two samples were designated as Samples E and F.

Two more identical samples were cut from a 60 mil (1.5 mm) thick sheet of Stamark brand Series 420 preformed, cold stick, self-adhesive pavement marking construction material to sample sizes measuring 3 inches (76 mm) by 6 inches (150 mm). Each of the two constructions was applied to the surface of a test brick which had been brushed clean, and each construction was held in place using foot pressure applied for at least one minute. These two samples were designated Samples G and H.

Two more identical samples were cut from a 75 mil (1.9 mm) thick sheet of HotTape brand preformed pavement marking construction material to sample sizes measuring 3 inches (76 mm) by 6 inches (150 mm). Each of the two constructions was applied to the surface of a test brick which had been brushed clean. The constructions were applied using a propane torch according to the instructions of the pavement marking manufacturer. These two samples were designated Samples I and J.

Samples E, G, and I were used as control samples. For each of Samples F, H, and J, a seal was applied to the outer perimeter of the construction using Devcon 2-Ton Epoxy as set forth above for Examples 1, and 2. The sealed constructions were then allowed to cure.

The concrete bricks to which Samples E through J were adhered were then placed on the rigid base within the outer frame and in the path of the tires of the impact tester described above. Weights were added to the horizontal frame of the impact tester to bring the total weight on the tires to 825 pounds. The environmental chamber was then adjusted to 40°C and 50% relative humidity. Once equilibrium had been reached within the environmental chamber, the motor was started and adjusted to 40 RPM. During the run, the individual samples were observed for failure. Failure was defined as set forth in Example 1. The results of this test run are set forth in Table 1.

EXAMPLE 4

Example 3 was repeated with new samples prepared as set forth above, except that the test was conducted with the environmental chamber adjusted to 23°C and 50% relative humidity. The same sample designations as were used in Example 3 were repeated for Example 4. The results of this test run are set forth in Table 1.

Table 1

Sample	Minutes Until Failure	
	Example 3	Example 4
E (control)	< 1	< 1
F (with edge seal)	18	25
G (control)	< 1	< 1
H (with edge seal)	28	33
I (control)	> 60	> 180
J (with edge seal)	> 60	> 180

According to the results of Examples 3 and 4, for the cold stick constructions, the use of an edge seal consistently provided significant improvements in the durability of such constructions. For the HotTape product in Example 3, the results showed that after 60 minutes, there was no edge lifting for Sample I, the HotTape product alone, or Sample J, the HotTape product with an edge seal. Similarly for Example 4, the results showed that after 180 minutes, there was no edge lifting for Sample I, the HotTape product alone, or Sample J, the HotTape product with an edge seal. However, for Example 3, the thicknesses of the constructions of Samples I and J were measured after the test. According to these measurements, even though there was no edge lifting for the sample that did not include an edge seal, the use of an edge seal improved the performance of the construction in that for Sample I, the control sample, the construction thickness had decreased from 75 mils (1.9 mm) to 10 mils (0.25 mm) during the testing while for Sample J, the sample with an edge seal, the construction thickness had only decreased from 75 mils (1.9 mm) to 60 mils (1.5 mm). Consequently, even for a product that is resistant to edge lifting, the use of the edge seal of the present invention can assist in minimizing the caliper decrease of pavement markings due to tire wear and thus, significantly improve the durability of the construction.

In the preferred embodiment, a pavement marking construction is applied as follows. The pavement upon which the construction is to be applied should be prepared according to the recommendations of the manufacturer. In general, a pavement surface should be free of any freestanding water and the construction is best applied at least 24 hours after any rainfall. The air temperature should be at least 50°F (10°C) and the pavement temperature should be at least 40°F (4°C). Preferably, both air temperature and pavement temperature are rising and the overnight air temperature is not less than 40°F. The pavement should generally be cleaned of contaminants such as oil, grease, sand, dirt, dust, loose aggregate, curing compounds, mud, soil or salt. Preferably the pavement is cleaned using high pressure water or steam. If water or steam is used in cleaning, the pavement should be allowed to dry before the pavement marking construction is applied. Once the pavement has been cleaned and is dry, the pavement marking construction is applied according to the manufacturer's instructions.

After the pavement marking construction has been applied, the sealing adhesive should be prepared. For a two-part epoxy, the epoxy and hardener can be mixed according to the epoxy manufacturer's instructions and then applied. However, where large quantities of a two-part adhesive are to be applied to form an edge seal, a static mixer such as a two-component cartridge mixer which permits the epoxy and hardener to be mixed as they are being applied helps to efficiently apply the edge seal. For one-part adhesives and epoxies, the adhesive is loaded into an applicator such as a caulking gun. A bead of adhesive is then applied around the perimeter of the pavement marking construction as set forth above. The adhesive is then cured according to the manufacturer's instructions.

Generally, it is desirable to minimize the time required for installation both to minimize the man hours required for installation, and to minimize the amount of time that the pavement being marked will be closed to traffic. Preferably, the application of the pavement marking construction, including the application of a sealing adhesive, should be completed in four hours or less.

In view of the preceding description, it will be apparent to persons skilled in the art that a number of modifications can be made without departing from the invention, the scope of which is limited only by the following claims. Throughout the text and the claims, use of the word "about" in relation to a range of number is intended to modify both the low and the high values stated.

WHAT IS CLAIMED IS:

1. A method for securing a preformed pavement marking construction having a top surface and at least one perimeter edge to pavement having a relatively flat roadway surface comprising the steps of:

adhering the preformed pavement marking construction to the roadway surface;

providing a curable structural adhesive;

applying the curable structural adhesive to the at least one perimeter edge of the preformed pavement marking construction such that the curable structural adhesive overlaps a portion of the top surface of the preformed pavement marking construction at its at least one perimeter edge and a portion of the roadway surface; and

curing the curable structural adhesive to form a traffic-bearing top surface extending between the roadway surface and the preformed pavement marking construction.

2. The method of claim 1 wherein the curable structural adhesive is selected from the group consisting of one- and two-part epoxies, multi-component polyurethanes, silicone adhesives; UV curable adhesives; UV curable resins, and combinations thereof.

3. The method of claim 2 wherein the curable structural adhesive is a two-part epoxy.

4. The method of claim 1 wherein the curable structural adhesive is applied using a caulking gun.

5. The method of claim 1 wherein the curable structural adhesive is applied around the entire perimeter of the pavement marking construction.

6. The method of claim 5 wherein the curable structural adhesive is applied as a strip having a width between about 0.2 inch and about 0.8 inch.

7. The method of claim 5 wherein the width is about 0.3 inch.

8. The method of claim 6 wherein the width overlaps the perimeter of the pavement marking construction by between about 0.1 inch and about 0.4 inch.

9. The method of claim 8 wherein the width overlaps the perimeter of the pavement marking construction by about 1/8 inch.

10. A method for securing a pavement marking construction having a top surface and at least one perimeter edge that has been adhered to pavement having a relatively flat roadway surface comprising the steps of:

providing a curable structural adhesive;

applying the curable structural adhesive to the at least one perimeter edge of the pavement marking construction such that the curable structural adhesive overlaps a portion of the top surface of the pavement marking construction at its at least one perimeter edge and a portion of the roadway surface; and

curing the curable structural adhesive to form a traffic-bearing top surface extending between the roadway surface and the preformed pavement marking construction.

11. The method of claim 10 wherein the curable structural adhesive is selected from the group consisting of one- and two-part epoxies, multi-component polyurethanes, silicone adhesives; UV curable adhesives; UV curable resins, and combinations thereof.

12. The method of claim 11 wherein the curable structural adhesive is a two-part epoxy.

13. The method of claim 10 wherein the curable structural adhesive is applied using a caulking gun.

14. The method of claim 10 wherein the curable structural adhesive is applied around the entire perimeter of the pavement marking construction.

15. The method of claim 14 wherein the curable structural adhesive is applied as a strip having a width between about 0.2 inch and about 0.8 inch.

16. The method of claim 15 wherein the width is about 0.3 inch.

17. The method of claim 16 wherein the width overlaps the perimeter of the pavement marking construction by between about 0.1 inch and about 0.4 inch.

18. The method of claim 17 wherein the width overlaps the perimeter of the pavement marking construction by about 1/8 inch.

19. A method for marking pavement having a relatively flat roadway surface comprising the steps of:

adhering a pavement marking construction having a top surface and at least

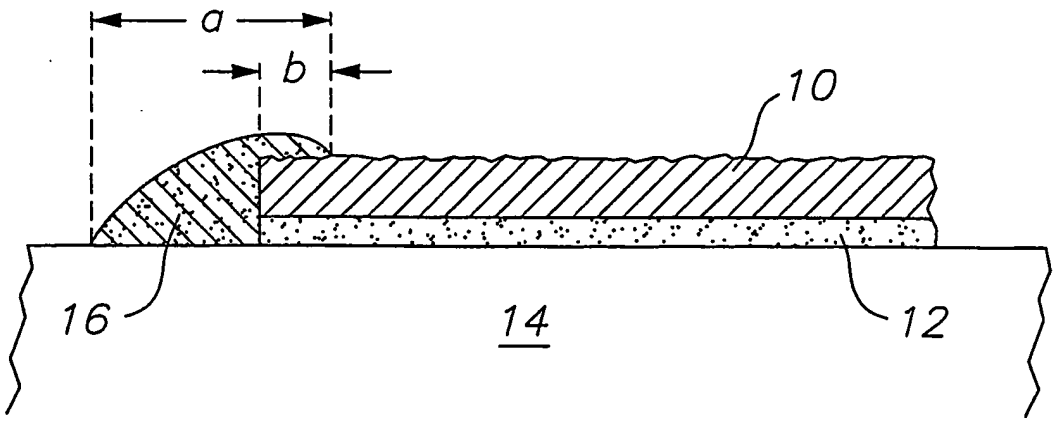
one perimeter edge to the roadway surface;

applying a curable structural adhesive to the at least one perimeter edge of the pavement marking construction such that the curable structural adhesive overlaps a portion of the top surface of the pavement marking construction at its at least one perimeter edge and a portion of the pavement surface; and

curing the curable structural adhesive to form a traffic-bearing top surface extending between the roadway surface and the preformed pavement marking construction.

20. The method of claim 19 wherein the curable structural adhesive is selected from the group consisting of one- and two-part epoxies, multi-component polyurethanes, silicone adhesives; UV curable adhesives; UV curable resins, and combinations thereof.

FIG. 1



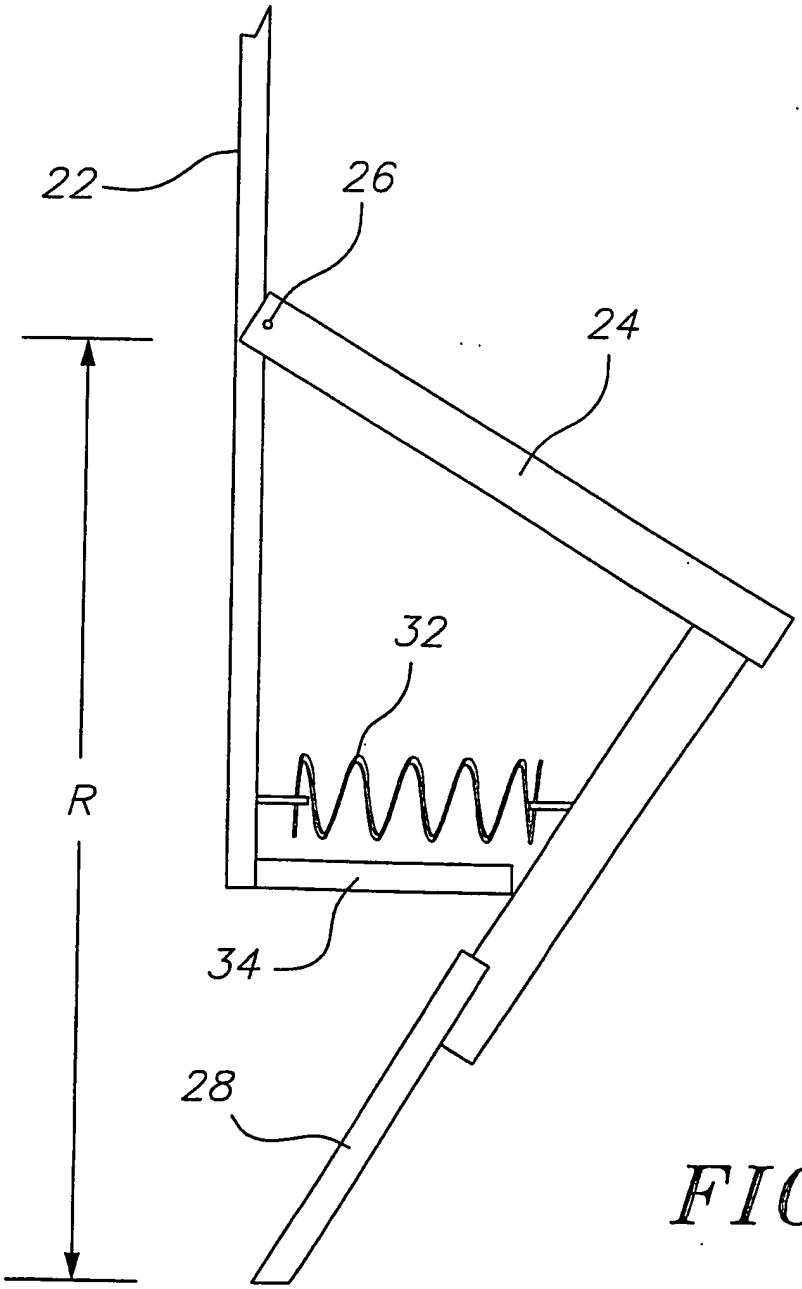


FIG. 2

INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 03/03156

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 E01F9/04 E01F9/08 E01C23/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 E01F E01C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 1 522 126 A (BROWN CO) 19 April 1968 (1968-04-19) page 4, column 1, paragraph 4 -column 2, line 2; figure 7	1,10,19
A	US 3 844 669 A (EIGENMANN L) 29 October 1974 (1974-10-29) column 4, line 20 - line 47; figures 3-5	1,10,19

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 May 2003	30/05/2003

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Kriekoukis, S

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

formation on patent family members

International Application No
PCT/US 03/03156

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